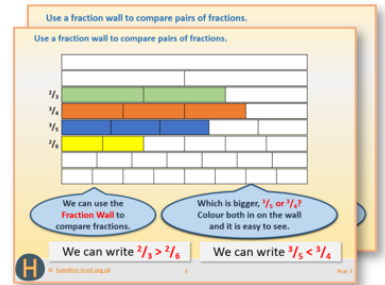


# Week 6, Day 5

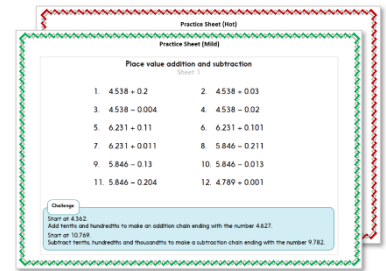
## Properties of quadrilaterals

Each day covers one maths topic. It should take you about 1 hour or just a little more.

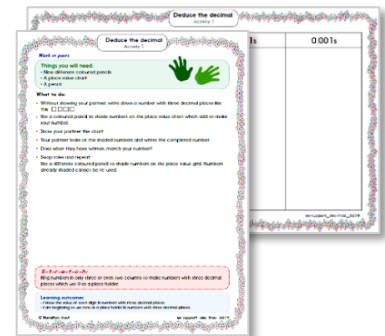
1. Start by reading through the **Learning Reminders**. They come from our *PowerPoint* slides.



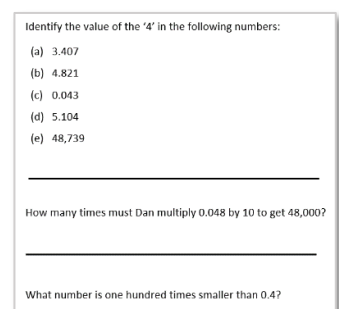
2. Tackle the questions on the **Practice Sheet**. There might be a choice of either **Mild** (easier) or **Hot** (harder)! Check the answers.



3. Finding it tricky? That's OK... have a go with a grown-up at **A Bit Stuck?**

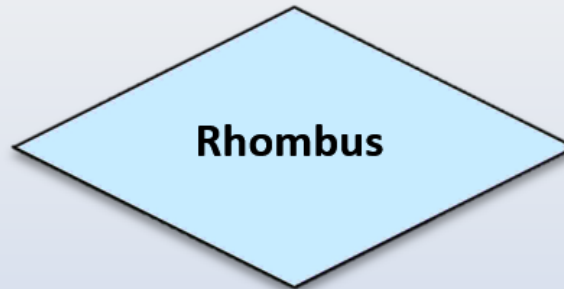
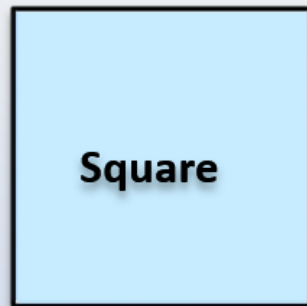
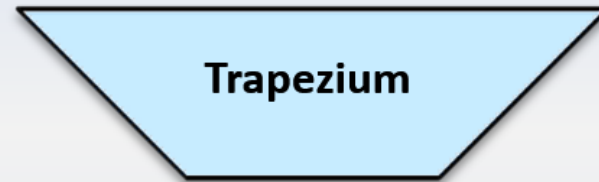


4. Have I mastered the topic? A few questions to **Check your understanding**. Fold the page to hide the answers!



## Learning Reminders

Investigate properties of quadrilaterals.

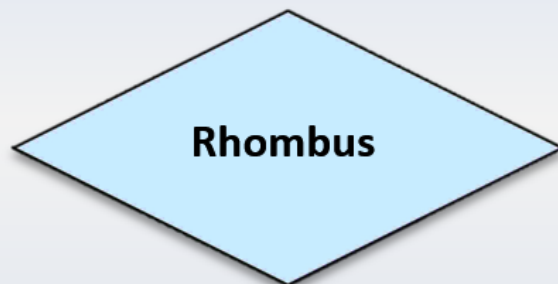
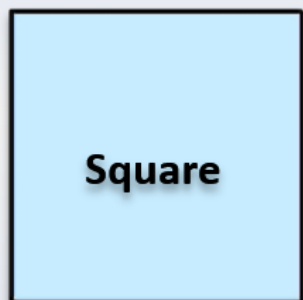


A quadrilateral is **any** polygon with **four straight sides**.

Can you identify the parallel and perpendicular lines in these shapes? (Check the learning reminder from yesterday if unsure). **?**

## Learning Reminders

Investigate properties of quadrilaterals.



A rectangle and square have all right angles. A square and a rhombus have all sides the same length. BUT only a square has both – all equal angles AND all sides the same length. A square is THE **regular quadrilateral**.

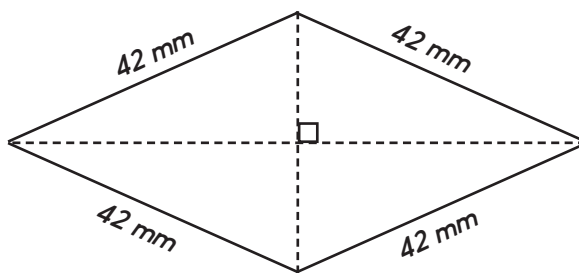
## Practice Sheet Mild

### Properties of polygons - quadrilaterals

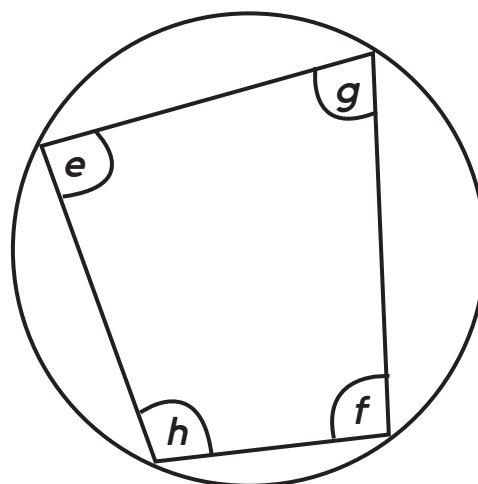
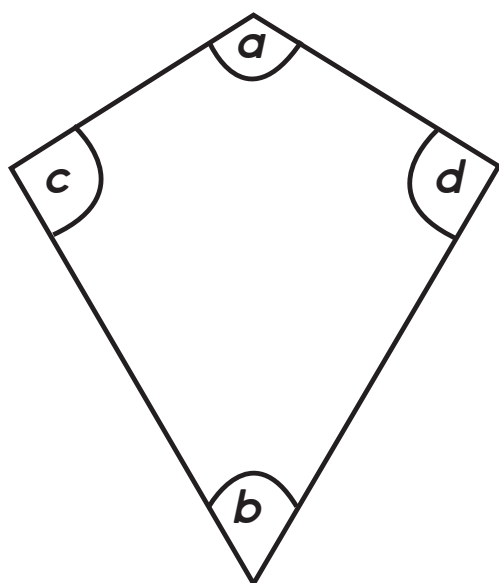
Complete this sheet if you have a **protractor** at home.

1.

What is this shape?  
How do you know?



2.



Use a protractor to measure the angles in these shapes.  
Write them down.

What do you notice about:

- $c$  and  $d$ ,
- the total of  $e$  and  $f$ ,
- the total of  $g$  and  $h$ ?

3. In your book or on the back of this sheet, draw a quadrilateral with one pair of perpendicular sides.

#### Challenge

Draw two more quadrilaterals.  
Measure and add up the four angles in each shape. What do you notice?

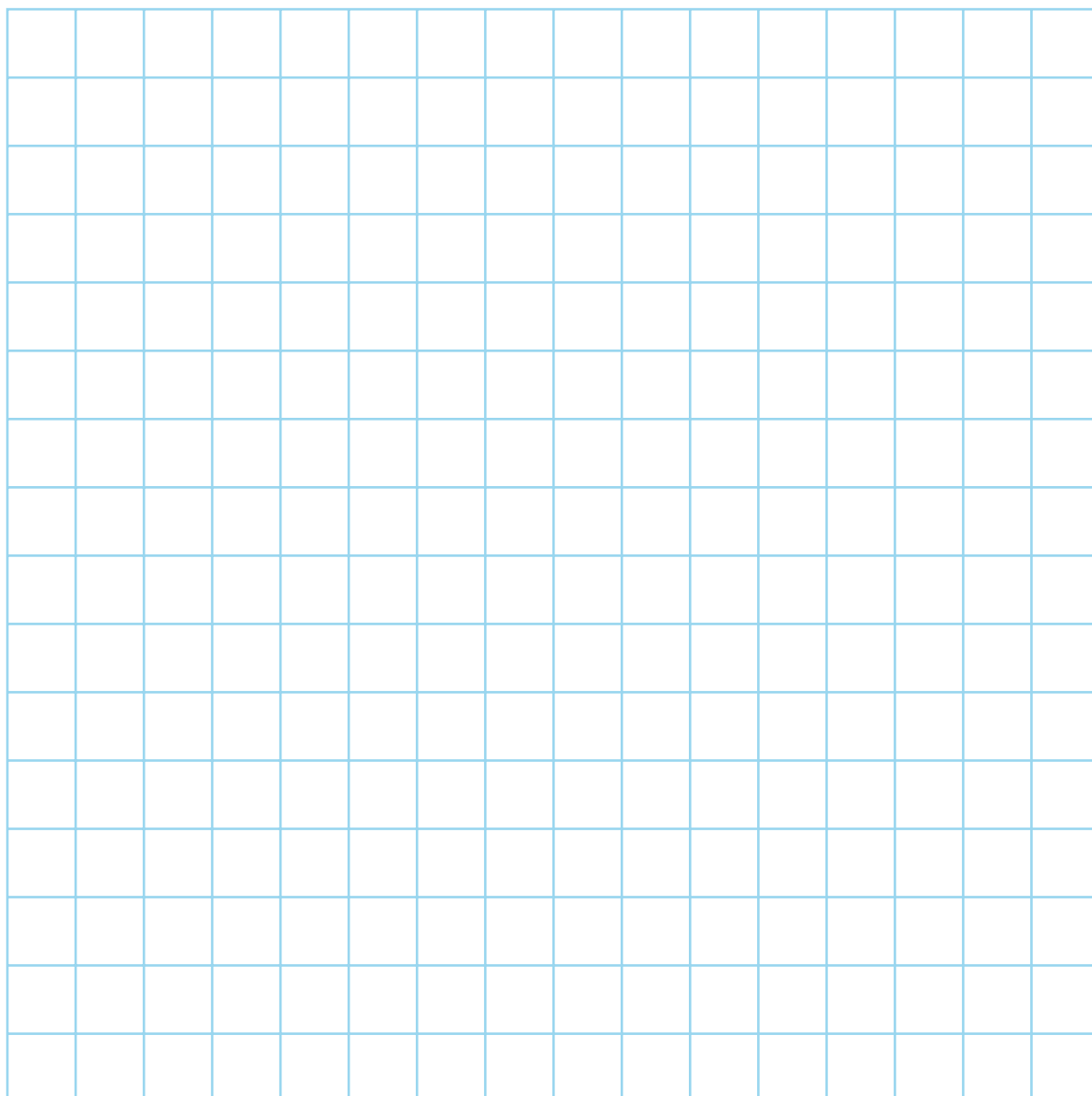
## Practice Sheet Mild

### Investigating quadrilaterals

- With a ruler draw five or six different quadrilaterals on the squared paper (see examples on the Learning Reminders).
- Use a ruler to join opposite vertices of the quadrilaterals.
- Investigate what is special about diagonals of different types of quadrilateral.

Which have diagonals that cross each other at right angles?

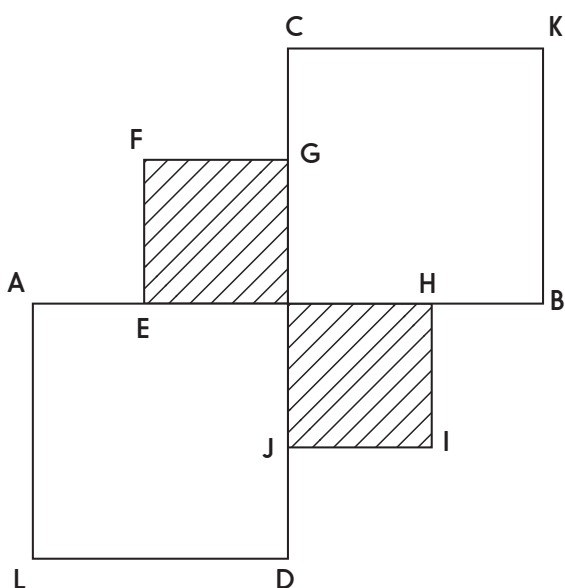
Which have diagonals that bisect (cut in half) each other?



# Practice Sheet Hot

## Exploring quadrilaterals

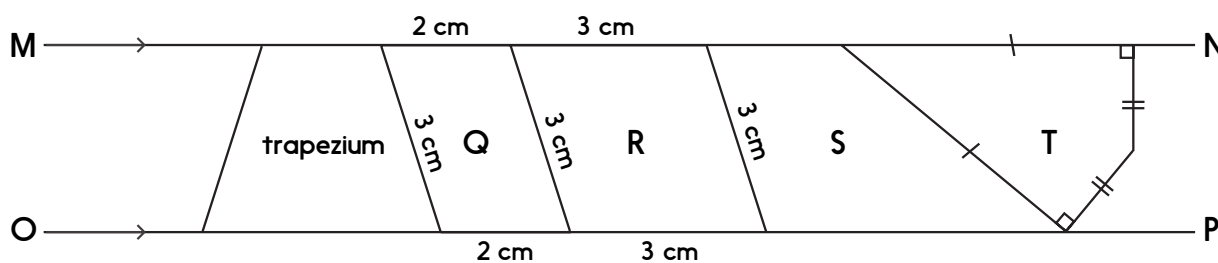
The grey shapes and the white shapes each have four equal sides and four equal angles.



TRUE or FALSE...?

- The grey shapes and the white shapes are squares.
- The grey shapes and the white shapes are all regular quadrilaterals.
- None of the shapes are polygons.
- Lines AB and CD are perpendicular to each other.
- Lines CK, AB and LD are all perpendicular to each other.
- Lines FE, AB and IJ are all parallel to each other.
- Lines AL and KB are parallel to AB.

2. The lines MN and OP are parallel. Some shapes and lengths are labelled.



- How many pairs of parallel sides does the trapezium have?
- Q and R show a rhombus and a parallelogram. Which is the parallelogram?
- How many pairs of parallel sides do Q and R each have?
- Describe shape S.
- Describe shape T.

### Challenge

Draw and label your own pattern using perpendicular and parallel lines. Describe the lines, shapes and angles in your books.

# Practice Sheet Answers

## Properties of polygons - quadrilaterals (mild)

1. Rhombus. It has four equal sides, the opposite sides are parallel and the diagonals bisect each other at right angles.

2.  $a = 116^\circ$        $b = 60^\circ$        $c = 92^\circ$        $d = 92^\circ$   
 $e = 86^\circ$        $f = 94^\circ$        $g = 76^\circ$        $h = 104^\circ$   
i)  $c$  and  $d$  are equal      ii)  $e$  and  $f$  add up to  $180^\circ$       iii)  $g$  and  $h$  add up to  $180^\circ$

3. Check that the children have drawn a four-sided shape with two sides perpendicular (at right angles) to one another.

### Challenge

Check the children have drawn two more quadrilaterals and that they have noticed that all the internal angles always add up to  $360^\circ$ .

## Investigating quadrilaterals (mild)

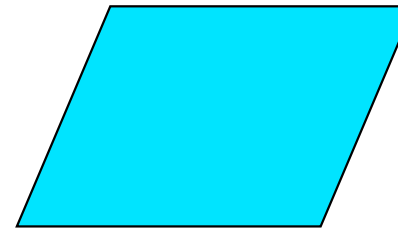
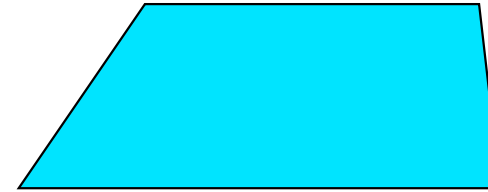
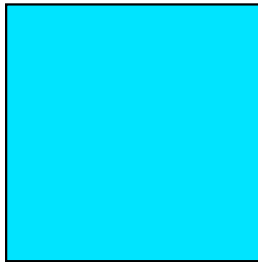
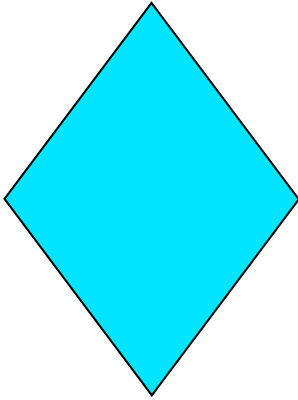
The diagonals of a square and rhombus cross at right angles; the diagonals of a square, rhombus, rectangle and parallelogram bisect each other.

## Exploring quadrilaterals (hot)

1. a) True  
b) True  
c) False  
d) True  
e) False  
f) False  
g) False.
2. a) 1 pair  
b) Q  
c) 2 pairs: making them both parallelograms  
d) Trapezium: one pair of parallel sides  
e) Kite: 2 pairs of adjacent equal sides, has 2 right angles (not all kites have this latter property), diagonals bisect at right angles

## A Bit Stuck?

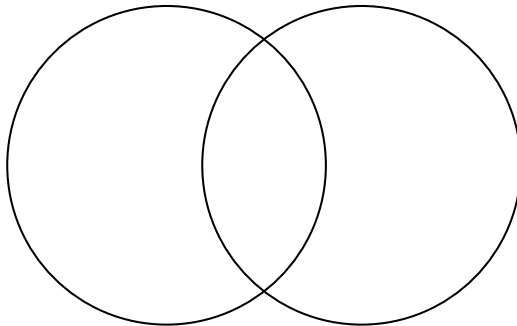
### Sorting quadrilaterals



Cut out the quadrilaterals. Copy the Venn diagram and sort the shapes into the correct places.

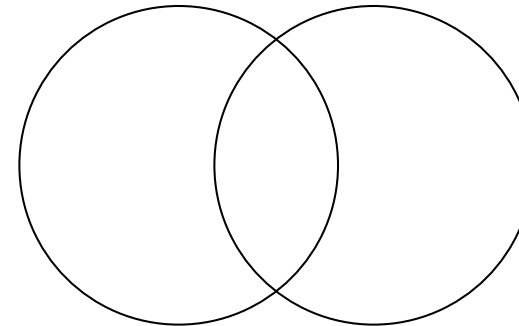
All sides are the same length

Four right angles



Has at least one pair of parallel sides

Symmetrical



#### Challenge

Now find your own way to sort the quadrilaterals. Your Venn diagram might even have 3 hoops!



# A Bit Stuck? Answers

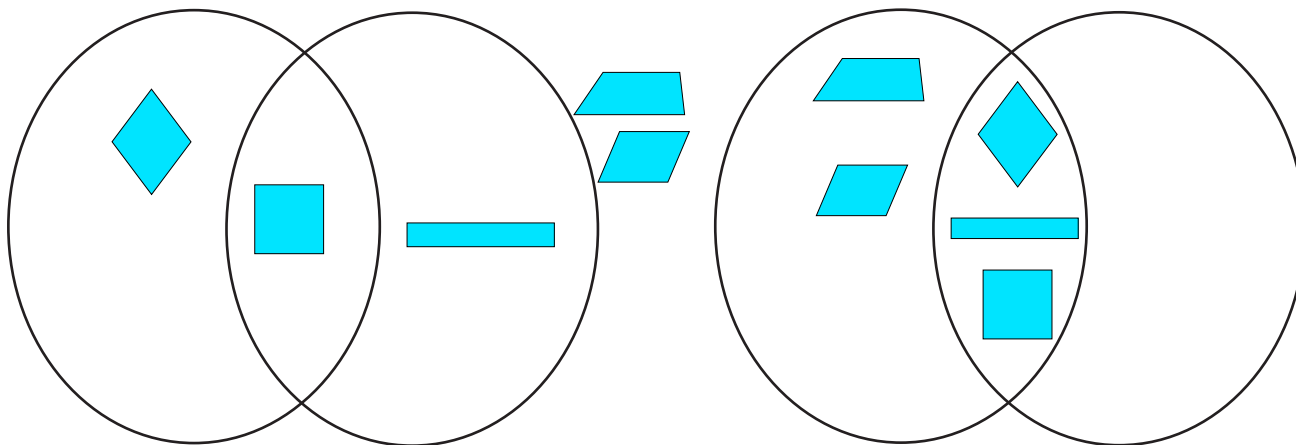
## Sorting quadrilaterals

*All sides are the same length*

*Four right angles*

*Has at least one pair of parallel sides*

*Symmetrical*



## Check your understanding

### Questions

Is this a polygon?

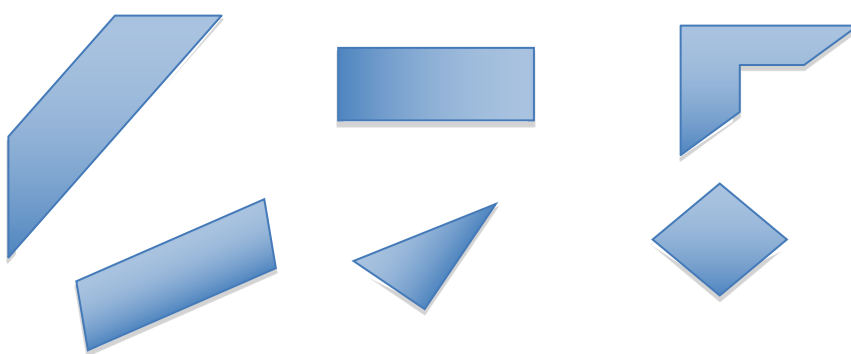


---

Draw any polygon and list five of its properties.

---

Which of the following shapes are quadrilaterals?



## Check your understanding

### Answers

Is this a polygon?



No. A polygon has all straight sides, so a semi-circle is not a polygon.

---

Draw any polygon and list five of its properties.

Refer to properties such the number of sides and angles, regularity, symmetry and using other mathematical vocabulary correctly, e.g. parallel, perpendicular, angle types.

---

Which of the following shapes are quadrilaterals?

